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The Effects on Completion Rates and Comprehension using a
Blended Flipped Classroom with Tiered Instruction in
Accounting and Computer Applications high school classrooms.

Submitted on December 17, 2018

in fulfillment of final requirements for the MAED degree

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Advisor _____

Date _____

Abstract

This study was designed to examine the effects of a blended flipped model classroom with tiered instruction. Students involved in the study were students in grades 9-12, enrolled in either a high school Accounting or Computer Applications class in a private school in Fargo, North Dakota. Data sources included student surveys, summative assessments in the form of assignments and tests, and formative assessments in the form of teacher observations and a student questionnaire completed by participants at the conclusion of the study. Results show student comprehension appears to remain steady with the new method, although more study on student comprehension is encouraged. Teacher observation showed student engagement to improve from the first week of the study to the final week. Observation showed that students became engaged in the process and began working together as they became more familiar with the new method. Student responses indicated a mixture of some students liking the new method while others did not like being able to ask teachers questions during video instruction. Continued implementation of this method would include continued availability of videos as students indicated they liked the videos as an additional resource for study and review, mixed with more traditional methods of teaching for complex curriculum to provide students and teachers an opportunity for timely discussion and questions.

Keywords: blended flipped classroom, tiered instruction, video lessons

Technology has changed how teachers transfer content knowledge to students. Gone are the day of rigid classrooms, students sitting in rows, teachers standing at a chalkboard channeling their knowledge through lecture into the student mind. Lecturing, according to Ridder-Symoens, as cited by Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt & Wederoth (2014), has been the predominant mode of instruction since universities were founded in Western Europe over 900 years ago. Notebooks and pencils are becoming less and less of a staple in the current classroom setting. Technology has provided new opportunities for teachers to transfer content to students, has changed how students receive and retain curriculum, and how student produce output of coursework. Online learning management systems have opened doors for teachers to share content or collect student work. Alternative deliveries for content can give students and teachers more opportunity to interact in guided classroom activities.

As a computer application and an accounting teacher, most of the curriculum in my classes is product-based learning. Students use computers to complete different tasks and challenges. A typical day in my classroom is to start with a 15-20-minute introduction of the day's task. Students then have 25-30 minutes to complete assignments relating to that task. Prior observation has shown that a continuous challenge in my classroom is time to complete these assignments with guided support. Limited class time often encourages students focus on completion rather than mastery of content. Students often would need additional time outside of class to work on their own or during a study hall to complete assignments. This additional work time would not have the benefit of guided instruction. My goal was to study ways to increase time in my class for production rather than transfer of curriculum. I studied the effects of a blended flipped classroom

environment achieved by implementing a blended flipped classroom environment combined with a task achievement tiered approach.

A flipped classroom model is an approach where students receive the transfer of curriculum as homework through videos. Students may also participate in online group discussions, blogs or wikis. In a flipped classroom model, all transfer of curriculum is through an online setting. Blended flipped classrooms are a combination of digital instruction and face-to-face learning. Videos are used to for lower-order thinking skills like transfer of content or content clarification. Students use technology to watch videos outside of class time or as homework. This allows students to work through content at their own pace and provides the opportunity to review and repeat content as needed. Class time is focused on a short review of content followed by work time in a teacher guided setting.

In addition to a blended flipped model classroom I used a tiered learning approach. Typically, students in my computer applications classroom have a wide variety of skill levels, particularly typing speed. Typing speed directly affects a student's ability to complete work in class. With a tiered approach, students were separated into tiers that related to their typing speed. Students with slower speeds had modified shortened assignments to allow time to complete the assignment for the objective of the day without needing extra time due to typing speed. Students in both tiers worked on the same content mastery, but with different length of content. For example, when working on business letters Tier 1, students with higher typing speeds, had an assignment with 300 words, whereas Tier 2 had an assignment with only 200 words, which allowed them to complete the assignment in similar amounts of time. Accounting also had tiered instruction based on their mastery of content. Throughout each unit there were quizzes designed to

examine their mastery of a concept. If mastered, students moved on to more challenging problems, if not mastered, they continued with assignments that encourage mastery of content.

A goal of this study was to increase guided classroom time for student work, without the loss of comprehension, by sharing content as homework and leaving class time for production. This classroom model requires student access to the internet and the use of a computer. A driving force behind my decision to research a blended-flipped classroom was our schools recent 1:1 iPad initiative. All students in our building have their own iPad that will allow them to watch videos. Students need access to internet to watch videos. If students do not have access at home, they have access to wifi during school hours, before school, after school and in evenings when events are scheduled at school. There are also multiple public locations in our community that offer free wifi. Videos were limited to 15 minutes to ensure that students could find time to watch them outside of class time. Success was evaluated through student questionnaires and observations. One concern I developed during my research to prepare for this project was the possibility of lower comprehension of content and feeling less engaged with a blended classroom design. To examine this, I compared assessment scores for this year's students to last year's students to determine if there was a loss of comprehension of content with the new classroom design. I used a three-week period of pre-research assessment scores to establish a baseline for comparison.

The purpose of this study was to see if a blended-flipped model classroom would increase class time available for guided instruction by providing traditional lecture material in a video form as homework outside of the class, while maintaining or improving the comprehension of course material. Observation in previous years has

shown that a continuous challenge in my classroom is time to complete these assignments with guided support. Students in computer applications and accounting courses often must arrange to come into the computer lab to finish homework assignments. With the implementation of 1:1 devices in our school, each student at Shanley High School has an iPad, but most of the computer applications and accounting homework assignments cannot be done on an iPad due to the software available on the device. New classroom models, such as the blended-flipped model, are now possible as each student now has a device and only needs internet, available in the school, most homes, and public buildings like libraries, the mall and local businesses, to watch the video homework. In addition to a blended-flipped model, this study examined the use of tiered instruction as one means of aiding in the completion and comprehension of material during class time.

Review of Literature

One problem that educators face, in content heavy courses, is class time for students to complete homework with the benefit of teacher assistance. Traditional classrooms are lecture style classrooms followed by assignments to reinforce the lesson of the day. Traditional lecture-style methods often focus on 30-50 minutes of instructional time followed by homework completion. With this type of instruction, there is very little class time available to complete any assignments given that relate to the topic (Fulton, 2012). Lecturing, according to Ridder-Symoens, as cited by Freeman, et al. (2014), has been the predominant mode of instruction since universities were founded in Western Europe over 900 years ago.

Several studies have been done in the last 10-15 years to change the classroom model. Technological advancement has provided new opportunities for educators to change the traditional classroom. One style studied is a classroom model called a flipped

classroom. The flipped classroom movement finds inspiration from Khan Academy, created by Salman Khan, an online learning environment that provides tutorials for students (Ash, 2012). A flipped classroom is a student-centered approach where students receive the transfer of information in a homework setting instead of the traditional lecture setting in the classroom. Lectures are given as homework and the traditional homework and activities are done in the classroom (Strayer, 2007). The teacher records lectures in a video that students watch outside of class, during a time convenient to them, and at their own pace. Students watch videos, read, outline and take notes outside of the classroom, often followed by some form of evaluation before the next class session. Students may also participate in online discussions, blogs, or wikis. This approach involves students in the learning process (e.g., Baytiyeh, 2017; Jundt, P., Moormann, K. A., Voorhees, A. M., & Ziemann, S., 2015; Snyder, Besozzi, Paska & Oppenlander, 2016). A typical schedule in a flipped classroom consists of 5-10 minutes of class discussion time to answer questions from videos the students watched before class time. Following this review, classrooms transition to activities planned that relate to the material. The teacher can walk through the classroom while students work checking for understanding and providing guidance. This classroom model optimizes class time for students by using learning activities in class which allows students to work in teams, interact with teachers, and develop problem-solving skills. The flipped classroom helps classroom time become more efficient, providing teachers with more time to communicate and spend with students (e.g., Baytiyeh, 2017; Price, 2013; Schoology, 2016; Strayer 2007).

Classrooms where student learn by doing are in alignment with Cognitive Theory. Cognitivism poses using prior knowledge and problem-solving skills together with active participation to learn new skills. The flipped classroom model allows students to

learn new knowledge from watching lectures as homework and participate in active learning activities in the classroom to strengthen that knowledge. Instructors observe participation and behavior to determine knowledge and processing of information. As stated by Rick Reis on the Stanford's *Tomorrow's Teaching and Learning* website, "Cognitivism uses the metaphor of the mind as a computer: information comes in, is processed, and learning takes place." (n.d.) Flipped classrooms provide students with the opportunity to take in knowledge, process it and apply it to new situations.

Flipped classrooms change the cycle of how course content is introduced. There is a shift from the traditional lecture-homework cycle found in traditional classrooms to one where a deeper understanding of the material is the focus of the classroom rather than the homework (Strayer, 2007). Bergmann and Sams (2013) feel that courses that are content heavy will benefit from the flipped classroom method. "Courses that are didactic, that consists of large quantities of content on the low end of Bloom's taxonomy--will likely undergo a greater transformation in the flipped classroom model" (p. 16). Schoology (2016) and Rath (2014) also recommend focusing videos on lower-order thinking skills, leaving class time to work on high-order skills. As seen in Figure 1, Bloom's taxonomy begins with lower-order thinking skills related to recalling fact and having students be

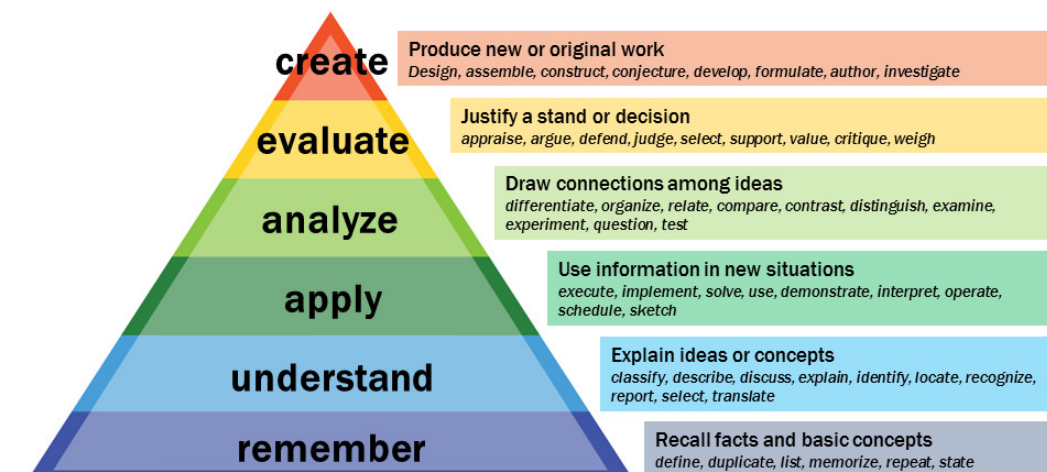


Figure 1 Bloom's Taxonomy, a hierarchical ordering of cognitive skills (Mcdaniel, 2018)

able to explain ideas and concepts. Flipped models focus more on Bloom's taxonomy of lower-order thinking skills outside of the classroom where students watch video lessons or readings. Educators can then focus on higher-order thinking skills like drawing connections among ideas and producing new work in the classroom (Mcdaniel, 2018).

"The important thing is to keep the lower-order things on Bloom's taxonomy to the videos and the higher-order things in class," Bergmann (2012) says. "Class time is a learning experience for the student, not a download and upload of knowledge" (p. 71).

Studies show mixed results from using the flipped classroom method. Research done by Snyder et. al, (2016) found that there was little positive result of a flipped classroom. In fact, only a few teachers that were part of the study, kept the flipped classroom. Dr. Berrett, (2012, as cited in Snyder et al., 2016) states the flipped classroom model "demands that faculty members be good at answering students' questions on the spot, even when their misconceptions are not yet clear because they are still processing the information" (p. 30). Studies have found little performance improvement in classroom assessments by students. Instead, they found that students were more confident in their knowledge, more aware of their learning process, and had an increased sense of confidence in their ability to learn independently (e.g., Baytiyeh, 2017; Strayer, 2007).

Jundt et al. (2015) found student achievement improved with the flipped classroom model, but improvement was more visible at the lower spectrum where failure rates appeared to drop significantly. Remarkable increases in student achievement were found in students who were experiencing failure in the classroom. Baker's study found that students collaborated more in and outside of the classroom. Students felt that they were given more independent instruction and had more opportunities to learn from working with peers in the classroom (2000). Overall, a majority of students in Foster's

(2018) study showed improvement in grades. In Baytiyeh's (2017) study, many students responded to surveys saying that they felt more involved in the learning process and more confident in communicating with others.

According to Freeman et al. (2014), there were significant benefits attributed to active learning in a flipped environment for students in Science, Technology, Engineering and Math (STEM) classrooms. Active learning is the process of learning while performing activities or participating in class discussion rather than obtaining the information by lecture. Freeman's results indicate that "average examination scores improved by about 6% in active learning sections and that students in classes with traditional lecturing were 1.5 times more likely to fail than were students in classes with active learning." One advantage to active learning is the use of higher order thinking skills including collaboration and problem solving. Freeman et al.'s (2014) study found that the greatest effects were in small classrooms of under 50 students.

Other studies have used a modified flipped classroom, often called a blended classroom to solve the time management issue. A blended flipped model provides a mixture of face-to-face instruction with some digital instruction. "Blended learning is, in many ways, a collaboration between educators and their students with the goal of improving the learning experience" (Schoology, 2016, p.3). Blended models include a mastery-based portion where students benefit from the flipped model for lesson content, then work at their own pace with teacher guidance until they master the topic (Price, 2013). A University of San Francisco professor used a flipped classroom technique but used the video material to provide clarifying or additional material. After trying a traditional flipped classroom approach, he felt that students would benefit from an

introduction period of in class general instructions and materials followed by videos at home to enhance the topics (Ash, 2012).

Engaging reluctant learners can become even more of a challenge in a self-paced learning environment (Ash, 2012). Instructors need to be aware of common pitfalls in a flipped classroom environment. Class time needs to be structured. Students need guidance when introduced to a new classroom model. Common student struggles include poor course organization, and poor use of class time (Foster, 2018). Students are learning 21st century skills by becoming problem solvers and independent learners. Blended classrooms offer an opportunity to provide differentiated instruction where students can work at their own pace. Advanced students, or students with special needs, can benefit from this self-paced atmosphere. Students have an opportunity to work at their own pace and even work ahead. This flexibility encourages students to develop time management skills (e.g., Bergmann & Sams, 2012; Price, 2013). Students appreciate the flexibility of lessons online. If they understand the topic of the day, they can work quickly through the video. Some students watch portions of the video repeatedly to reinforce concepts. Students that are very busy can watch portions of the video between classes or other obligations rather than trying to focus during one setting (Jundt et al., 2015). In the study by Snyder et al. (2016), students responded overwhelmingly that they were much more engaged when videos were embedded with questions for review. Observations made by a high school instructional coach showed that students were able to take the time if they needed it to work through a complicated assignment or those who hadn't previously been challenged could fly through the basics to reach more challenging exercises (Ash, 2012).

Both models, flipped and blended, provide distinct benefits. Flipped classroom models increase interaction time between students and educators. Educators are no longer

spending a majority of class time in a lecture model. Educators can observe students while working through assignments. Students that are struggling with similar content or topic can work together in a collaborative group for support. Students that have mastered a concept can assist classmates as they work through the material. Students are better prepared for class which allows teachers to spend most of the class period assisting students with questions. Students have the accessibility of the lessons outside the classroom. Videos are accessible anywhere there is internet access. Students can use computers, laptops, tablets, or smartphones to access the videos. Schools can help success by having access to computers at school but outside of class to watch videos. Also, most videos would be available using a cell phone. Parents can access the videos which help them have a better understanding of the curriculum the students is working through and can also help the parent assist students in understanding a difficult topic. Absent students have the opportunity to view missed coursework (e.g., Bergmann & Sams, 2012; Jundt et al., 2014; Price, 2013; Strayer, 2007).

There are drawbacks to using a flipped or blended model classroom. One disadvantage is time. Some teachers reported that they were able to create their own videos faster than the time it took to discover the perfect video online (Raths, 2014). Students need to develop particular learning skills when in a flipped classroom. Students must learn to manage their time and regulate their participation (Boeve, Meijer, Bosker, Vugteveen, Hoekstra, & Alberts, 2016). Students that are absent from class find making up work to be a longer process. Students can watch the videos they missed, but they also need to make up the class time that was missed. Students can feel less of a connection to the class and the instructor with the flipped model (Strayer, 2007). Learning contextual information becomes a responsibility of the student. Students must become active

learners in a flipped model classroom (Jundt et al., 2015). Some students in Foster's (2018) study responded that they felt the inverted classroom model increased a student workload.

A second disadvantage is increased screen time. Some researchers are concerned that by creating a flipped classroom model, educators are increasing screen time for students. Teenagers already spend an average of five to seven hours in front of a screen each day (Alter, 2017). Educators need to ensure that additional screen time is beneficial for learning and not only a substitute for classroom instruction. Technology needs to be user friendly and should be used to enhance student learning and not become an additional burden when a new tool of instruction is introduced (Strayer, 2007). Bergman & Sams (2012) argue that using a flipped model embraces the digital culture of our youth, using it to help them learn rather than refusing the use of today's technological tools. Before switching to a flipped classroom model, educators should study student demographics to ensure there are the technological resources in place for students. Some demographics could have the additional challenge of student access to technology as an issue (Price, 2013).

As Snyder et al., (2016) noted, instruction does not take place with student-teacher interaction, so teachers rely on student participation for transfer of curriculum. Students need to learn how to perform in a flipped classroom model. Students in the study by Price (2013) related some frustrations about the flipped style because they were unable to ask questions right away if something was puzzling. Unlike traditional models, flipped classrooms are more collaborative oriented with much self-direction. For students to succeed in a new learning environment they need to be taught appropriate, effective learning skills. Price (2013) found in her study that students in a flipped model needed

more guidance to stay on task, often finding the unstructured classroom a distraction. Strayer (2007) found that students would sometimes have difficulties staying on task during classroom activities and would need additional direction to avoid disruptions. He stated that much more of his time was spent on managing student engagement than would be spent in a traditional style classroom.

Research shows that using a blended model, if established correctly, should aid in additional classroom work time and focus. If using this model, educators need to determine the source of the videos, either self-created, located elsewhere, or a combination. Rath (2014) recommends starting small, flipping a classroom is a large time commitment, start with one class at a time. Educators need to explain the process to students and parents. Students need to learn the process for watching the videos. Short lessons or tutorials on how to watch videos educationally rather than for entertainment will help in student success. A WSQ, or Watch, Summarize, Question framework is recommended. Students should watch the videos, have some form of summary and plan a question designed to clarify a topic or about the topic to bring to class. Schoology (2016), an online learning management system, recommends using some form of learning management system. Online discussion boards provide an opportunity for students to become engaged in the process, ask and answer questions, and receive graded feedback from the instructor. Students can express creativity on discussion boards by finding or creating images, videos or other media that relate to the discussion. The Stortz & Hoffman (2013) study on student and teacher response to a one-to-one computer initiative, found students using videos and Keynote as ways to express their content mastery.

Schoology (2016) reminds us to be aware of your technological environment. Don't set up activities that use apps for Mac if your students are using Chromebooks. "A teacher needs to develop a system to ensure that students are watching the videos. The videos need to be engaging, and students need to be held accountable to the expectations of the instructor" (Price, 2013). Teachers will find that some students may not watch the videos. According to Bergmann (2014), "if half of your students don't watch your video content don't rescue them by teaching what is already in your video." Students who did watch the videos will feel that their effort was a waste of time. Also, he recommends that teachers avoid re-teaching what was on the videos. Re-teaching only encourages students to not do their homework. His suggestion is to have students who were prepared for class continue working on higher-order activities while those who did not watch the videos review them in class. Educators need to be aware of the length of the videos. Bergmann (2014) recommends about one minute or slightly more of video per grade level. Therefore, videos for 4th-grade students should last only about five minutes whereas a video for seniors could be about 15 minutes. He recommends condensing as much as possible to ensure students remain engaged. Schoology (2016) encourages instructors to keep videos to a 3-5-minute presentation (p.14). Keep in mind the quality of audio when creating your videos. External microphones are recommended for best quality (Jundt et al., 2015).

Traditional classroom models often focus on summative assessments (Swallow, 2017). A blended classroom model allows some flexibility in assessments with the availability of multiple methods. Educators may still consider summative assessments in the classroom, but alternate methods of assessment will help with student engagement and provide opportunities for students with different learning styles. Open-ended

assignments allow students to express their knowledge on the topic (Schoology, 2016). Maniotes and Cellucci (2017) used student screencasts to share their mastery of subject material. Teachers should consider embedding questions into videos or requiring a question related to the material to encourage student participation (Boeve et al., 2016). One key step to keep in mind is that assessments should be random, so no two students have identical assessments to ensure integrity (Price, 2013).

Tiered activities in the blended classroom are one option in differentiating the classroom to meet the needs of different learners. Tiered lessons are created with multiple levels of accomplishment focused around a concept. Students choose the level of achievement they would like to obtain (Peterson, 2016). Levy (2008, as cited in Peterson 2016) encourages tiered lessons “by content or through the assignments, homework, reading, materials, or assessments” (p.6). Walk students through your expectations. Practice accessing the videos, assignments, and assessments so students have a clear understanding of the navigation of the material (Schoology, 2016).

Introducing a new classroom model will have rocky moments. Teachers need to figure out what works for them and their students. Constant evaluation and improving strategies are key as you work through the process (Schoology, 2016, p.28). “Today’s students grew up with Internet access, YouTube, Facebook, MySpace, and a host of other digital resources. They can typically be found doing their math homework while texting their friends, IMing on Facebook, and listening to music all at the same time. Many of these students report that when they come to school, they must turn off and dumb down because their schools ban cell phones, iPods, and any other digital devices. The sad thing is that most students are carrying in their pockets a more powerful computing device than the vast majority of computers in our underfunded schools—and we don’t allow them to

use it” (Bergmann & Sams, 2012, p. 20). A blended classroom model focuses on using the technology available to students as a tool for learning. Educators can embrace the tools to enhance classroom learning. Students can maximize class time for collaborative and guided learning, with the opportunity to complete work in class. Collectively, a blended model with tiered instruction has the end goal of improved student comprehension.

Methodology

This study was conducted at a private senior high school in Fargo, North Dakota. The participants of the study consisted of forty-one high school students in either an accounting or a computer applications classroom. Of the forty-one participants, twenty-five students of the students were male and sixteen were females. There were twenty-eight ninth grade students, eight tenth grade, two eleventh grade, and three twelfth grade students. Thirty-seven of the participants were white, three participants were black. This study was conducted over a four-week period early in the fall semester.

Students in each classroom was given an explanation of the study and a description of the new blended-flipped classroom design. All students were given passive letters of consent to bring home to parents and guardians. Letters included a description of the study and new classroom design, and an option to refuse to be part of the study. Students or parents who did not want their child to be part of the study had an opportunity to sign and return the assent form prior to the start of the study. No forms were returned, so all forty-one students were included in the study.

A blended flipped model provides a mixture of face-to-face instruction with some digital instruction. Transfer of curriculum occurs as homework with students watching videos as the form of instruction. Blended models include a mastery-based portion where

students benefit from the flipped model for the lesson content, and then work with teacher guidance through activities designed to help master the content. Tiered instruction provides students options to help guide them through the activities. Students received the traditional transfer of content, or lectures, as homework via videos. Students would watch a 5-10-minute video introducing new material for each unit. The following class period would begin with either a quiz on the videos or a question and answer review of the content. This would then be followed by activities designed to practice and master the content.

Accounting units would start with quizzes (see Appendix A) to determine which tier would be more beneficial to student learning. Tiers were designed to either review the concepts in more detail or move through the basic concepts quickly to focus on more in-depth and challenging content, often using new material in a different way. Computer Applications students were split into tiers determined by keyboarding speeds. Assignments were designed to use the same skills and concepts but were modified in length to be completed in similar amounts of time based on keyboarding speeds.

Before I began the study, class was conducted for three weeks using the traditional classroom model to develop a baseline. One concern I had of using a blended-flipped classroom model was loss of comprehension of the material. To evaluate the comparison of comprehension of material I decided to compare the class average scores of last year students to this year students (see Appendix B). The 3-week baseline provided comparisons of scores using the same traditional classroom method used in previous years. I followed that baseline period with a 4-week blended model classroom method.

Data collection began with baseline comparisons between the 2017 and 2018 fall semester student scores for the first three weeks of school. Class averages from teacher-made assessments and book assignments for both classes were recorded and compared for the initial three-week baseline. To ensure accurate data collection, I used the same tests and assignments in the 2018 class that were given to the 2017 class. This quantitative data allowed a comparison to be made between the performance of last year's students to this year's students. During the study assessments were again recorded for the same units of work, the same assessments and book assignments to determine if there was an effect, positive or negative, on student comprehension of subject matter.

Students evaluated their own progress toward completing their assignments. Students were given benchmarks of completion goals within each tier in the form of a pathway (see Appendix C). At the completion of each unit students would evaluate their progress by using a self-assessment rubric (see Appendix D) designed to evaluate their work toward completion and mastery of the content. Student self-assessments for each unit had them evaluate their engagement in the classroom, had them track if they watched the videos assigned, and requested that they analyze their completion and mastery of content.

Teacher qualitative analysis was conducted in the form of observational records. A tally mark sheet (see Appendix E) was used to track student engagement throughout the research period. One of the goals of a blended classroom is to engage students in the learning process. The use of tally marks on observational behaviors provided information about whether or not students were engaged in the process and using class time efficiently to complete work. Students were observed at three different times during the class period. The first observation was at approximately 10 minutes after the introduction

of the day's work. The second observation was conducted at approximately the half-way point of the class. The final observation was typically conducted when there was about 10 minutes left of the class. Included on the tally sheet was a simple yes or no as to whether or not the student had completed the task for the day. These tally sheets provided a comparison between student engagement and completion rates of daily work.

Students completed a questionnaire (see Appendix F) at the conclusion of the research period to evaluate their response to the effects of a blended classroom style. Students were asked if the videos were used as an introduction of the material, as a study aid before assessments, or both. They were asked if they took notes during the videos, if they rewound the videos for clarification of a topic or used them as review for unit assessments. Students had input on if the blended classroom environment encouraged them to complete coursework during class time with the benefit of teacher aid. Students also had input on if they felt they mastered the new material using this different classroom model. Included in the questionnaire were options for students to expand on things they liked about the blended model and things they didn't like about the blended model. This feedback would be of assistance when moving forward with this classroom design.

Analysis of Data

I considered this study because I wanted to study the effects of a blended-flipped classroom environment. This study was conducted at a private senior high school in Fargo, North Dakota. There were forty-one accounting and computer applications students participating in this study. Of these forty-one students, thirty-seven participants were white, three were black, twenty-five students were male, and sixteen were female. Various grades were represented with twenty-eight ninth grade students, eight tenth

grade, two eleventh grade, and three twelfth grade students. This study was conducted over a four-week period early in the fall semester.

I began the study with a three-week period using a traditional style teaching method. Students would receive new information through a lecture style followed by guided practice with independent practice assigned as homework. This three-week period was used as a baseline for comparison to determine if there was a change in comprehension between the two methods. I followed this three weeks with four weeks of the new teaching method. Students watched videos as homework. These videos were lecture style instruction including some demonstrated practice. When students came to class the next day, there would be a short review of the information, but the focus of the class time was guided practice following by independent practice with the teacher available for guidance. If it was the beginning of a new unit for accounting, students would take a placement quiz to determine which tier they would follow. The intent was to have students complete activities for Tier 1 or Tier 2. Throughout the study the eleven students in accounting always tested on the same tier, which did not allow for tiers to be compared during the study.

At the conclusion of the study students were asked to participate in a questionnaire. Students were asked if they liked the new model of instruction. Of the

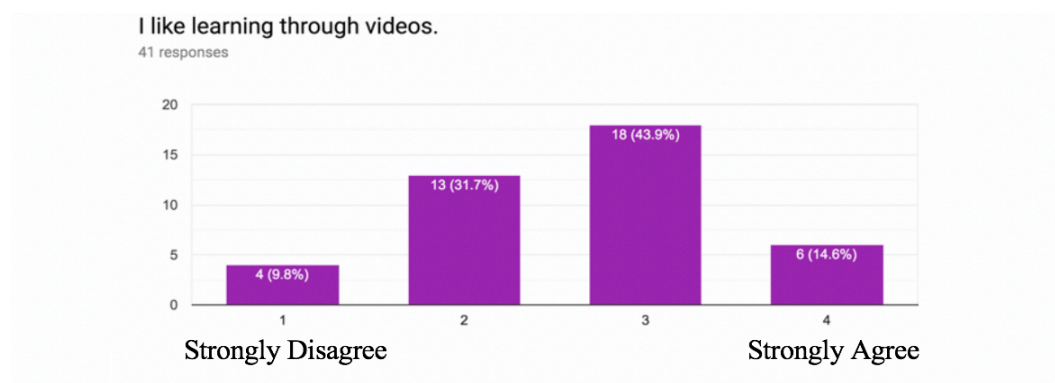


Figure 2 Student responses to the question "Do you like learning through videos?"

forty-one students involved in the study, a majority of them answered favorably to this question. As seen in Figure 2, twenty-four students answered in a Likert scale question that they liked learning through videos. Student were asked to share something they liked about the blended-flipped classroom model. Student responses indicated there were several things that they liked about using videos as the main instructional method. Table 1 provides some student examples of comments made in favor of this method. Eleven

Share something positive you liked about the blended-flipped classroom model	
•	I liked being able to have a thing to watch or listen to before the test or a quiz or to review something that I didn't understand completely.
•	another useful resource if I didn't understand something.
•	having more time during class to do our homework
•	I liked that the videos were short and brief and helped me understand the topic better
•	We did our work in class and we could ask questions about the projects.
•	It is easier to find how you learn best and it is nice to switch it up a little every once in a while.
•	I liked that we could turn to the videos when we had questions, which was great when you're at home and can only ask a question through email.
•	if I forgot something, I can go look at the videos
•	I liked how I could review the videos after school and take as long as I needed to learn it
<i>Table 1: Examples of positive responses about blended-flipped classroom method.</i>	

students indicated that they liked having additional class time to work on their assignments. Seven students commented on how they were able to use the videos to review something they didn't understand, and five others used the videos as a review for assessments.

More class time to work on assignments opens opportunities for improvements in student engagement. Teacher observation was conducted with a tally sheet to track student engagement and completion of tasks throughout the class period. I also kept a journal of observations throughout the study. Students were observed shortly after work was assigned, mid-way through the class period and once again when there was

approximately 10 minutes left in the class period. During the first week of the study I observed that students were having some difficulty with the structure of the class. Students were off unfocused and off task during the first week. Students were unfamiliar with the new class structure and struggled with how to use the additional class time efficiently. One student's comment from the post questionnaire sums this struggle up perfectly when they said "I didn't like that we learned the content for the class outside of class, and then only used our class time for practice. It felt like a study hall for Computer Apps". There was a learning curve for both the students and me. Without the traditional classroom style, new routines needed to be developed to focus students' attention on the task at hand. We would start each class with a five-minute hot topic review, a review of the key points of the previous day's video, followed by an introduction to the day's assignments and tasks to be completed. Once this became routine student focus improved. As this routine developed students were able to understand what was expected of them and some of the off-task behavior, like playing games on their devices, instant messaging their friends on their devices, and non-relevant conversations during class time also improved. As they became familiar with their devices and the structure of the class, student engagement improved. As seen in Table 2, as student engagement increased so did their completion rate of coursework. Also noted in my journal entries was an

Teacher Observations		
Week	Percentage of Observations Where Student Were on Task	Percentage of Students Completing Daily Tasks
1	74.4%	36.7%
2	87.8%	56.7%
3	93.3%	63.3%
4	92.8%	67.8%

Table 2 Teacher observation of student engagement

observation of an increase of student collaboration. Students began working together to solve questions rather than always consulting the teacher.

With new content being shared as video homework, this opened up more class time for students to work with teacher guidance. Table 2 also shows improvements in work completion rates as the new classroom model continued. Students were asked in the post-study questionnaire to share if they felt that using the new classroom model helped them finish their assignments during class time rather than needing to find time outside of class to finish their work. Students responded very favorably. Figure 3 shows that thirty participants agreed or strongly agreed that with the new classroom model they were able to finish assignments during class time.

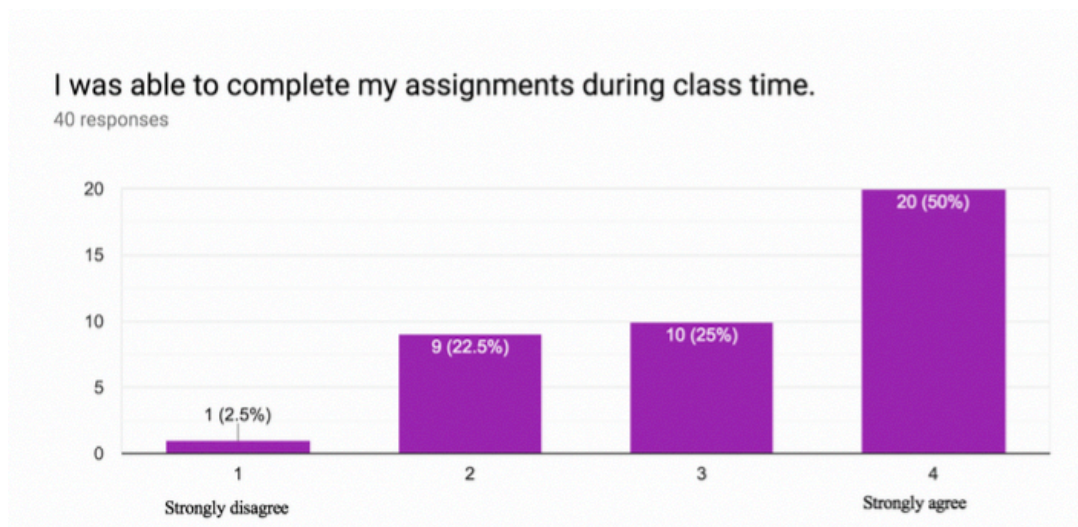


Figure 3 Student responses to statement "With the new teaching model I was able to complete my assignments during class time."

One of my concerns with the new classroom model was the possible loss of comprehension of the material. The student questionnaire asked students to evaluate their comprehension through the video assignments rather than the traditional lecture style. Students were able to consider their comprehension during the first three weeks and then compare it to their comprehension during the four weeks of the study. Figure 4 shows that students did not feel that they were comprehending the material as well as they did

during the traditional model. Thirty-three participants responded unfavorably indicating

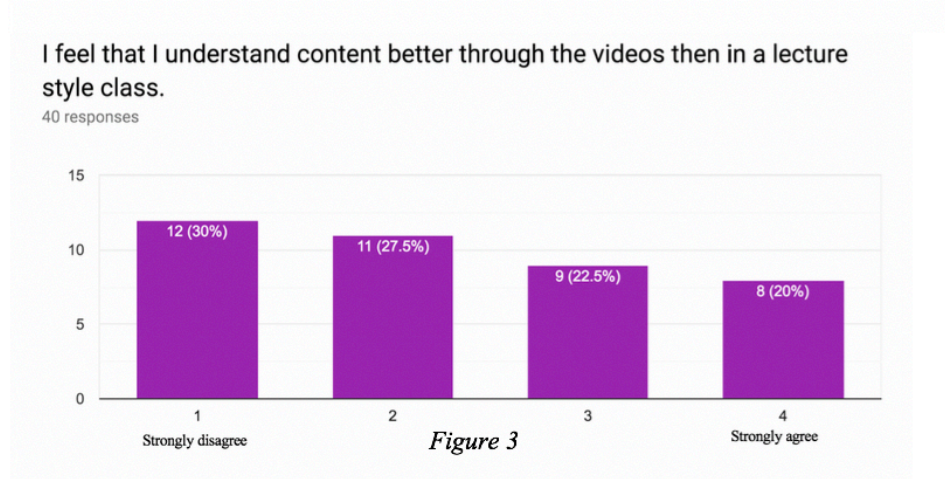


Figure 4 Student response to the statement "I feel that I understand content better through the videos then in a lecture style class".

they were not as satisfied with videos as their primary source of new material. Only four students responding that they strongly agreed that the blended-flipped model helped them comprehend that material. Students were also asked to share something they disliked about the new classroom model. Table 3 shows student responses. The overwhelming response on student comments was their inability to ask timely questions when watching the videos. They often mentioned that they did not like being able to ask

Share something you disliked about the blended flipped style classroom.
• I didn't like not being able to ask the teacher questions
• I don't learn very well through videos
• I like being taught by the teacher right away so if I have questions, I can ask her right then and there instead of waiting for class the next day and possibly forgetting what I had a question on
• I always forget to watch the videos
• Watching videos at home can get boring and you can easily get distracted.
• I didn't like that we learned the content for the class outside of class, and then only used our class time for practice. It felt like a study hall for Computer Apps.
• I dislike actually having to watch the full video because I get distracted
• sometimes videos were confusing, and we couldn't ask questions until the next day
Table 3 Examples of negative responses about blended-flipped classroom method.

the teacher questions while learning the new material. Students also commented multiple times that they would often get distracted while watching the videos or sometimes forget to watch them.

Although this does not necessarily correlate with comprehension of the material, it does suggest that students were not comfortable with the new model. To help determine if comprehension was affected, I tracked the averages of the class on a variety of assessments throughout the study. For both my accounting and computer applications courses I tracked the average class scores of the current fall of 2018 students and compared them to the average class scores of the fall of 2017 students. I then recorded the average class scores for the four weeks of the study as shown in Figures 5 and 6. The blue vertical line shows the starting point of the study. Computer Application students, as seen in Figure 5, do not show a change in comprehension. Averages for Computer Applications do not show trends in comprehension, negative or positive. Students in the

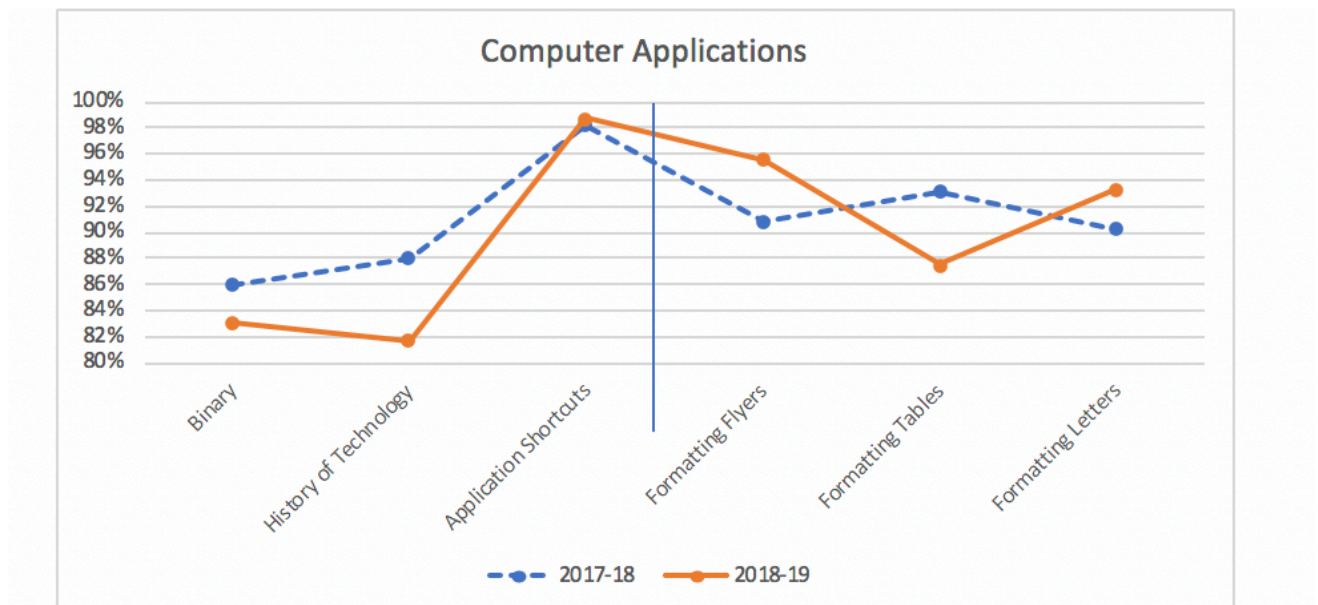


Figure 5 A comparison of student scores in Computer Applications from fall of 2017 to 2018.

2018 study sometimes scored higher and sometimes scored lower both before and during the study. There is no consistent trend of data to show if comprehension has improved or

declined. Accounting students, as seen in Figure 6, also sometimes scored higher and sometimes lower than the previous year's class.

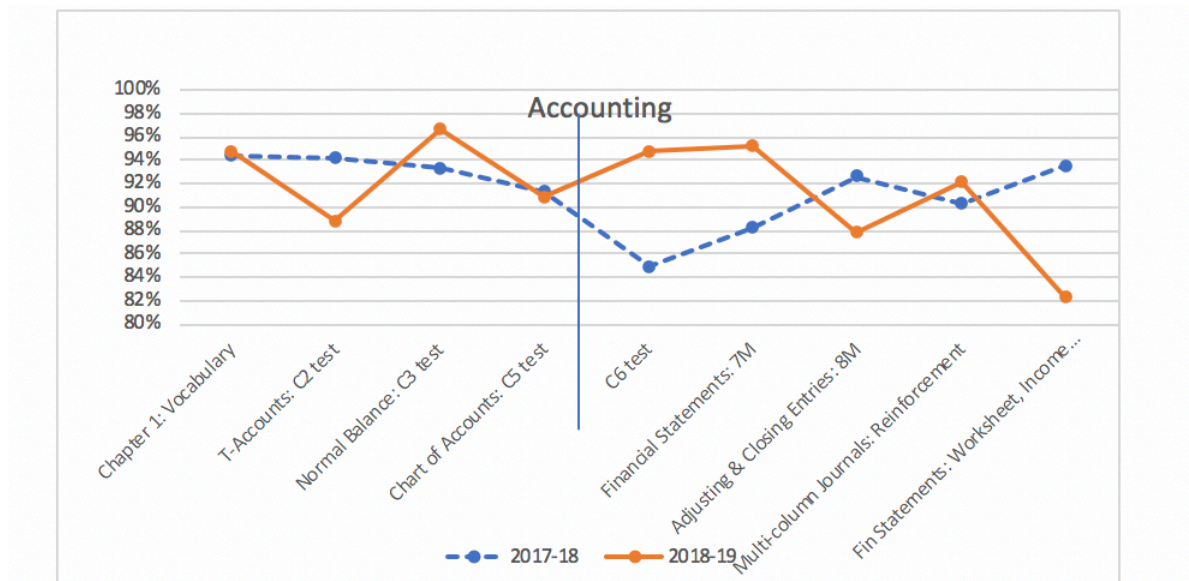


Figure 6 A comparison of student scores in Accounting from fall of 2017 to 2018.

Action Plan

Using a new teaching method is always an interesting challenge. Using a blended-flipped model classroom provided its own challenges, the first of which is time. It is time consuming to create the videos required as homework for the blended-flipped style classroom. It is also important to take time to show students how to access the videos and to provide guidance to students successfully watching the videos. One focus of this study was time. In classrooms like my accounting and computer applications classes where students are producing work, time is important. They need time to complete the daily assignments and using a blended-flipped classroom model provides more class time with guided teacher instruction. Students could watch the lecture part of a classroom at home as homework, providing more class time to complete coursework. A concern with using videos as the instructional method is whether or not students comprehend the material the same as when instruction is done in a lecture style.

Student feedback was valuable. When students were asked if they liked learning through videos over half of the students responded that they liked learning through videos. Students comments in favor of videos included the ability to watch videos on their own time, having an additional resource to review for tests and quizzes, or having more time during class to do homework. At the conclusion of the research project I had several students request that I continue posting videos as they would often use them to clarify material or for test review. Some of them like to watch the videos before we start a unit, and then when we cover it in class, they have the basic introduction and can ask clarifying questions as we work through the material. Others expressed appreciation for the additional class time gained from watching videos at home. Students were able to spend more class time with guided instruction and completion rates improved.

Even though students responded that they liked the videos as a learning method, their responses to the question about comprehension were less favorable. A majority of the students responded that they did not comprehend the material as well when using videos as the lecture. Responses focused on comments stating that they did not like having to wait to clarify confusing statements or ask questions as the material was covered. Tracking of scores for Computer Applications does not prove or disprove this theory. Accounting scores appear to show that there is a negative effect on comprehension, but this conclusion cannot be made without more study.

Observations I made in a journal included entries about feeling less aware of student comprehension of the topic without having their immediate feedback in the form of questions and concerns. I really missed the dialog that takes place when lecturing in class. I appreciated the time we had collectively to work on assignments. I was able to spend more time with each student answering questions and providing guidance. One

negative was if a student was not a self-advocate and was not in one of the first groups I worked with, it would often be near the end of class before I was able to answer specific questions by that student.

Additional class time was an obvious advantage of a blended flipped model. Assessment scores were tracked to determine if using the blended flipped model affected student performance. Summative assessment results for Computer Applications were inconclusive. For the first two units the students involved in the study scored lower on two of the three assessments. During the study, this same group scored higher in two units, but lower in one. There were no visible trends of improvement or decline in this class. Prior to the study accounting scored higher on one assessment, lower on another, and roughly the same on two others. During the study they scored higher on three assessments and lower on two assessments. What is possibly a larger factor, and would require more study, is the downward trend in the last unit. A continuation of the study and additional tracking would establish if this was an isolated incident or the beginning of a trend.

The results of my study have encouraged me to continue creating videos for all content in my classroom. I would encourage my students to continue to use the videos as an introduction to new topics, and again as a review before assessments. Students should be encouraged to take notes while watching videos and to rewind and watch again sections of the video that are confusing the first time watched. Students that are absent would have the ability to watch the videos to learn and review content that they missed during class time. If students are having difficulty understanding a topic, they would have the videos as an additional resource to help understand the content. I also intend to add

more videos for topics that are commonly misunderstood or complicated. These videos will include additional examples and guided practice.

Even though I intend to continue using the videos as supplements for course work, I do not intend to continue using the blended-flipped model classroom style. My own observations in journal entries discuss a feeling of disengagement from my students. Lecture style may be more traditional, but if mixed with dialog to test student comprehension it can provide instant feedback to the instructor. With the blended-flipped method I had more time to provide guided instruction and observation of student comprehension, but I was missing the overall class dialog to determine comprehension. Several times I did not notice a student struggling with a concept until well into the class period. I had more time to walk around the room and work with each group of students, but if the group that was struggling was the last group I spoke with, there was much less class time remaining to assist in understanding the concept. Students would often come to class with questions they had written down while watching the videos. Presented with questions, I would either take the time to answer them, which kept the class from getting started on assignments, or ask the students to wait until I completed the guided instruction. This often led to some discontent from the students as they felt their concerns and questions were of a less priority.

My overall experience with the blended flipped model was favorable. Based on the finding of this study I would recommend using videos to enhance content in the classroom. Videos of lecture materials provide a great resource for students as an introduction, review, or clarification of material. Videos may not be the best substitute for lecture, but they can provide basic introduction of topics or clarification to difficult concepts. The blended flipped model provides additional class time for student

engagement. It would be recommended to create a system that allows students to share questions prior to class to allow the teacher time to review key points of disconnect at the beginning of the class period. Flipping a classroom supports collaboration with peers and encourages students to take responsibility for their education. Educators interested in flipping their classroom need to expect some frustration from students as they get comfortable with a new learning style. Flipping a classroom can be beneficial for classrooms like science, math, and technology, where students can benefit from guided practice with an instructor. Educators considering the flipped classroom model need to be aware of the preparation time needed to effectively create the key elements-the videos and identifying how students will access to videos. Flipped classrooms can be very beneficial with the right planning.

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3c4a025298)

Appendix A

Example of Pre-Test

Section 2 Pre-Test

Section I									
1.	<p>When the owner invests cash in a business, the owner's capital account is _____. (#3)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a debit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a credit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a debit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a credit</td></tr> </table>	<input type="radio"/>	increased by a debit	<input type="radio"/>	increased by a credit	<input type="radio"/>	decreased by a debit	<input type="radio"/>	decreased by a credit
<input type="radio"/>	increased by a debit								
<input type="radio"/>	increased by a credit								
<input type="radio"/>	decreased by a debit								
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2.	<p>When a business pays cash on account, a liability account is _____. (#3)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a debit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a credit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a debit</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a credit</td></tr> </table>	<input type="radio"/>	increased by a debit	<input type="radio"/>	increased by a credit	<input type="radio"/>	decreased by a debit	<input type="radio"/>	decreased by a credit
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<input type="radio"/>	decreased by a debit								
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3.	<p>When cash is received from sales the amount is recorded as a debit to ____ and a credit to _____. (#3)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>cash, sales</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>sales, cash</td></tr> </table>	<input type="radio"/>	cash, sales	<input type="radio"/>	sales, cash				
<input type="radio"/>	cash, sales								
<input type="radio"/>	sales, cash								
4.	<p>When \$1,500 cash is received on account, cash is debited for that amount. (#3)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>True</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>False</td></tr> </table>	<input type="radio"/>	True	<input type="radio"/>	False				
<input type="radio"/>	True								
<input type="radio"/>	False								
5.	<p>The normal balance side of an asset account is the _____. (#2)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>debit side.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>credit side.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decrease side.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>unaffected side.</td></tr> </table>	<input type="radio"/>	debit side.	<input type="radio"/>	credit side.	<input type="radio"/>	decrease side.	<input type="radio"/>	unaffected side.
<input type="radio"/>	debit side.								
<input type="radio"/>	credit side.								
<input type="radio"/>	decrease side.								
<input type="radio"/>	unaffected side.								
6.	<p>When cash is paid for advertising, Advertising Expense is _____. (#3)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a debit.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>increased by a credit.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a debit.</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>decreased by a credit.</td></tr> </table>	<input type="radio"/>	increased by a debit.	<input type="radio"/>	increased by a credit.	<input type="radio"/>	decreased by a debit.	<input type="radio"/>	decreased by a credit.
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<input type="radio"/>	decreased by a credit.								
7.	<p>Cash is increased with a debit. (#2)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;"><input type="radio"/></td><td>True</td></tr> <tr><td style="text-align: center;"><input type="radio"/></td><td>False</td></tr> </table>	<input type="radio"/>	True	<input type="radio"/>	False				
<input type="radio"/>	True								
<input type="radio"/>	False								

The normal balance for any revenue account is the debit side. (#2)

8. ☐ True
☐ False

Identify each of the following as an Asset, Liability or Owner's Equity account. (#2)

Cash	Asset
Supplies	Asset
Capital	Owner's Equity
Prepaid Insurance	Asset
A customer that owes the company money	Asset
A vendor the company owes money	Liability
Owner's drawing account	Owner's Equity

9.

Purchasing merchandise from a vendor with the agreement that you will pay later is a cash transaction. (#4)

10. ☐ True
☐ False

Paying up front for Supplies is a cash transaction. (#4)

11. ☐ True
☐ False

Paying a vendor for merchandise purchased earlier is paying for a transaction on account. (#4)

12. ☐ True
☐ False

Appendix B
Comparison Tracking Fall 2017 to Fall 2018
Accounting and Computer Applications Assessments

Class Average Comparison:

Unit Name:	Class Averages 2017-18	Class Averages 2018-19	Change in percent
Computer Applications			
Binary test	86.0%	83.0%	- 3.0
History of Technology test	88.0%	81.7%	- 6.3
Application Shortcuts quiz	98.2%	98.7%	+ 0.5
Formatting Flyers test	90.8%	95.5%	+ 4.4
Formatting Tables test	93.1%	87.5%	- 5.6
Formatting Letters test	90.2%	93.2%	- 3.0
Accounting			
Chapter 1: Account Classification test	94.4%	94.8%	+ 0.4
Chapter 2: T-Accounts test	94.2%	84.8%	- 9.4
Normal Balances: Debit or Credit? Workbook 3M	93.4%	98.1%	+ 4.7
Chapter 5: Chart of Accounts test	91.3%	90.9%	- 0.4
Multi-column Journals: Workbook Reinforcement	90.3%	92.2%	+ 1.9
Financial Statements: Workbook 7M	88.3	95.2%	+ 6.9
Adjusting & Closing Entries: Workbook 8M	92.6%	87.9%	- 4.7
Chapter 6-7-8 unit test Financial Statements: Worksheet, Income Statement, Balance Sheet	93.5%	82.3%	-11.2

Appendix C Example of Accounting Pathway

Accounting Section 1.2 Pathway	
I can statements:	
A: I can classify accounts as assets, liabilities, or owner's equity. (1.2) B: I can analyze the effects of transactions on the accounting equation. (1.2) C: I can distinguish between cash and on account transactions. (1.2)	
Order of Operations: 1. Pretest 2. Conference to determine Pathway 3. Completion of Pathway 4. Assessment	
Introductory: No idea, help!	
A: Classify Accounts	Choose one of the following: <ul style="list-style-type: none"> Study chart of accounts P.3 Watch classification video Complete: <ul style="list-style-type: none"> Work with classmates to complete P.9 & P.10 of workbook Check answers here
B. Analyze effects on transactions	Choose one of the following: <ul style="list-style-type: none"> Read textbook page 13-16 Watch Haiku video 1.2 Complete: <ul style="list-style-type: none"> Work with classmates to complete p.11 and p.12 of workbook Quick conference with teacher to verify understanding Application 1-4 (Access file in Haiku, complete when all answers are shown as correct)
C. Distinguish between cash and account transactions	Read text page 14 and page 16 Create a table showing different types of transactions. Share with classmates to verify you agree with classmates
Emerging: I've heard of these, some knowledge.	
A: Classify Accounts	Watch classification video
B: Analyze effects on transactions	Complete: <ul style="list-style-type: none"> P.9 and check answers Application 1-4 (Access file in Haiku, complete when all answers are shown as correct) ** Watch Haiku video 1.2 if review is needed
C: Distinguish between cash and account transactions	Create a table showing different types of transactions. Share with classmates to verify you agree with classmates. Use text p.14 & 16 if review is needed
Mastery: I'm feeling confident, just need some review.	
A/B/C:	Complete Application 1-4 (Access file in Haiku, complete when all answers are shown as correct) ** Watch Haiku video 1.2 if review is needed Complete Challenge Problem p.18
Assessment:	Chapter 1 Test: Account Classification

Appendix D

Student Self-Assessment rubric

Student Self-Assessment**Name:**

Name of Unit _____

Tier 1 or Tier 2 _____

Question	Incomplete	Needs Improvement	Strong	Exceptional
Completion	I did not complete more than 2 tasks on my checklist.	I completed most of my assigned tasks on my checklist but did not submit 1 or 2.	I completed all assigned tasks on my checklist, but not always on time.	I completed all assigned tasks on my checklist for this unit on time.
On task	I typically used class time for other work and was seldom on task.	I found myself off task about half of the class day.	I found myself off task once or twice a day, but only for a few minutes.	I was on task 95-100% of the time.
Videos	I did not watch the videos for this unit.	I watched some of the videos for this unit.	I watched most of the videos for this unit.	I watched all of the videos for this unit.
Mastery of content	I don't understand this unit at all.	I understand some of the content but still have a few questions.	I feel that I understand most of the content.	I feel that I mastered the content in this unit.

Teacher Observation Tally Sheet

Week Number: _____

[illegible]

Appendix F

Post Study Student Questionnaire

5/6/2018

AR Post Questionnaire

AR Post Questionnaire

1. What is your current grade level?

Mark only one oval.

- ☐ Freshman
☐ Sophomore
☐ Junior
☐ Senior

2. What is your gender?

Mark only one oval.

- ☐ Male
☐ Female

3. I like learning through videos.

Mark only one oval.

	1	2	3	4	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

4. When watching videos did you (check all that apply)

Check all that apply.

- ☐ Watched videos without stopping
☐ Took notes while watching videos
☐ rewound videos as needed to review topic
☐ watched videos again as review before a test/quiz
☐ watched the video while also doing other things
☐ watched videos when I missed class (sick, school, etc)

5. How often do you view videos for class?

Mark only one oval.

- ☐ never
☐ 1 time per week
☐ 2-3 times per week
☐ 4-5 times per week
☐ 6-7 times per week
☐ 8 or more times per week

5/6/2018

AR Post Questionnaire

6. I feel that I understand content better through the videos then in a lecture style class.

Mark only one oval.

	1	2	3	4	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

7. I was able to complete my assignments during class time.

Mark only one oval.

	1	2	3	4	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

8. For class I(select best response)

Mark only one oval.

- ☐ watch all assigned videos
- ☐ watch most of assigned videos
- ☐ watch a few of assigned videos
- ☐ only watched 1 or 2 videos
- ☐ never watched any of the assigned videos

9. I typically watched my assigned videos.... (choose the best response)

Mark only one oval.

- ☐ during class time.
- ☐ in the morning before school.
- ☐ after school/in the evenings.
- ☐ during my study hall.

10. Share something you liked about the blended flipped style classroom.

11. Share something you disliked about the blended flipped style classroom.

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